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PAULINE SPERRY, *Properties of a certain projectively defined two-parameter family of curves on a general surface*. Pp. 213-214. [Reprinted from *American Journal of Mathematics*, 1918.] (Chicago, 1916.)

## UNDERGRADUATE MATHEMATICS CLUBS.

EDITED BY U. G. MITCHELL, University of Kansas, Lawrence.

### CLUB ACTIVITIES.

BARNARD COLLEGE MATHEMATICS CLUB, Columbia University, New York, N. Y.  
[1918, 226-227].

The officers of the club for 1918-19 are: Honorary president, Professor Edward Kasner; president, Janet Meneely '19; vice-president, Veronica Jentz '20; secretary, Georgia Schaaf '19; treasurer, Evelyn Baldwin; program committee: Gretchen Torek '19, Catherine Piersall '20, Marian Haskell '21.

The following are programs of meetings for 1918-19:

November 19, 1918: "Theory of ballistics" by Professor Edward Kasner.

December 16: "Descartes" by Alice Johnson '21 and Marian Haskell '21;

"Leibniz" by Helen Clarke '20; "Newton" by Mimosa Pfaltz '19.

January 14, 1919: "Occupations open to women taking mathematics" by Ellen Leut '18.

February 18: "Cycloids" by George W. Mullins, instructor in mathematics.

March 11: "Physics and mathematics" by Elaine Kennard '20; "Relation of curves to physics" by Catherine Piersall '29.

April 16: "Accounting" by Professor Wildman, New York University.

May: Business meeting.

DENISON MATHEMATICS CLUB, Denison University, Granville, Ohio.  
[1918, 403-04].

The officers of the club for the year 1918-19 are: President, Edgar King '19; vice-president, Esther Weaver '20; secretary-treasurer, Fern Whitney '21.

The programs for the first part of the year 1919 were as follows:

January 21, 1919: "The significance of mathematics" (excerpts from a paper by Professor Cassius J. Keyser<sup>1</sup>) by Professor Anna B. Peckham.

February 4: "Parallel coördinates" by Professor Forbes B. Wiley.

February 18: "Mathematics in artillery" by Lieut. R. Thompson '21.

March 4: "Fundamentals in mathematics" by Professor Charles C. Morris, Ohio State University.

March 18: "Parallel coördinates" (continued) by Professor Wiley.

April 15: "Centroides" by Esther Weaver '20; "Magic squares" by Alva Shumaker '22.

April 29: "Applications of mathematics to astronomy" by Professor Paul Biefeld, department of astronomy, Denison University; election of officers.

<sup>1</sup> "The Human Significance of Mathematics," *Science*, new ser., Vol. 42, No. 1089 (Nov. 12, 1915), pp. 663-680.

May 13: First annual banquet.

The club has about ten dollars in its treasury which it plans to use in purchasing portraits of noted mathematicians for the walls of the mathematics rooms.

The officers elected for the year 1919-20 are: President, Richard Howe '20; vice-president, Esther Weaver '20; secretary, Evangeline Nellis '22; treasurer, Alva Shumaker '22.

UNDERGRADUATE MATHEMATICS CLUB, University of Illinois, Urbana; Ill.  
[1918, 404-405].

Owing to the war conditions no meetings of the club were held during 1918-19 until February 5, 1919, when the following officers were elected: President, Irene Doyle '19; vice-president, Laura Stoll '19; secretary-treasurer, Beulah Prante '19.

Membership is limited to juniors and seniors majoring in mathematics and to those students who have attended three consecutive meetings. The average attendance is about twelve. The following programs have been given since February fifth.

February 19, 1919: "The training value of mathematics" by Beulah Prante '19.

March 5: "Mathematical puzzles" by Margaret Walker '19.

March 19: "Women mathematicians" by Irene Doyle '19.

April 9: "Maxima and minima" by Agnes Nelson '19.

THE WHITE MATHEMATICS CLUB AT THE UNIVERSITY OF KENTUCKY, Lexington, Ky. [1918, 90, 451-345].

The following is the list of programs for the first part of the year 1919.

January 13, 1919: "Geometric determination of  $\pi$ " by Professor Elijah L. Rees.

January 20: "Analytic determination of  $\pi$ " by Professor Harold H. Downing.

January 27: "Transcendence of  $e$ " by Professor Harold H. Downing.

February 10: "Euclid's Elements" by H. P. Pettit Gr.

February 26: "Transcendence of  $\pi$ " by Guy W. Smith, instructor in mathematics.

March 3: "A non-euclidean world" by W. W. Elliott Gr.; "Discussion of problems" by H. P. Pettit Gr.

March 10: "Introduction to linear associative algebras" by Dr. Guy W. Smith; "Solution of problems" by Professor Downing and H. P. Pettit Gr.

March 17: "History of the parallel postulate"<sup>1</sup> by Mary E. Beall '19; "Discussion of problems" by H. P. Pettit Gr.

March 26: "Some applications of vector analysis to the theory of ruled surfaces" by Professor Rees.

March 31: "Logical significance of definitions, axioms and postulates" by Edna Berkele '19.

April 7: "The net of Moebius" by Professor Paul P. Boyd.

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<sup>1</sup> The subjects discussed by undergraduates are selected from J. W. Young's *Fundamental Concepts of Algebra and Geometry* (Macmillan, 1911).

April 14: "Consistency, independence and categoricalness of a set of assumptions" by Frank W. Tuttle '20.

April 21: "A problem in partial differential equations" by Professor J. Morton Davis.

April 28: "Class, correspondence, number" by Frances Kimbrough '20.

#### CLUB NOTES.

A number of inquiries have been received asking if the editor of this department can suggest some mathematical games for the use of clubs at social meetings. Can not some of our readers supply us with descriptions of mathematical games or plays which they have found successful? The editor gives below several forms of entertainment, more or less mathematical, which have been used in social meetings of the club of which he is a member.<sup>1</sup>

*Mathematical contests.* Two captains choose sides as in an old-fashioned spelling match. The captain of each side designates a contestant to represent his side and the two contestants stand with their backs to the blackboard<sup>2</sup> while a member of the faculty places on the board back of one contestant a mathematical exercise and an assistant copies the same exercise on the board back of the other contestant. At a given signal the contestants turn and attack the exercise. The one first obtaining the correct answer is declared the winner and must defend his position against the next contestant designated by the captain of the losing side. The losing contestant drops out of the game. The play is continued until all of the contestants on one team have been defeated and the side whose representative is still undefeated is declared the winner of the contest. By continuing the play among the undefeated members of the winning team the champion of the club can be determined.

Where membership in the club is limited to upperclassmen, there is considerable latitude in the choice of exercises, but the use of simple exercises in arithmetic and participation in the contest by all members of the faculty as well as by all of the students are likely to produce a merrier time.

*Telling fortunes by mathematics.* *The Ancient Science of Numbers*, by Luo Clement (New York, Rogers Bros., 1909) is a book which is not likely to be taken very seriously by many of our readers; but it contains a system, taken seriously by its author, for telling something of the "apparently mysterious operation of the Science of Numbers, and its effect upon the health, happiness and success of the individual" which, in the hands of a clever operator, who has

<sup>1</sup> The *Teachers College Record*, New York, for November, 1912 (Vol. 13, pp. 385-495), is devoted to articles on "Number Games and Number Rhymes" by D. E. Smith, C. W. Hunt, F. J. Flynn, C. C. Eaton, R. K. Atwell, and F. B. Selkin. Chapter 3 (pp. 413-422) on "Rithmomachia, the great medieval number game" by D. E. Smith and C. C. Eaton, is reprinted, with a few modifications from this MONTHLY, April, 1911; a bibliography is given on page 495.

References to the literature of "Nim, a Game with a Complete Mathematical Theory" were given, in this MONTHLY, in Topics for Club Programs—No. 7, March, 1918. "Probabilities in the game of 'Shooting Craps'" will be discussed in the next number of the MONTHLY.—Editor-in-Chief.

<sup>2</sup> The meetings attended by the editor were held in a private home and a portable blackboard was brought in for the evening.

imagination and the ability to act a part gravely, may be made the basis of a pleasant evening's entertainment. The writer has seen it used on more than one occasion, but most successfully as the main feature of a Halloween party with a member of the faculty taking the part of the fortune-teller. The house was decorated with jack-o'-lanterns, paper witches, black cats, etc., and an appropriate booth in a corner of a room was provided for the fortune-teller. The "fortunes" told were based on the "Ancient Science of Numbers" but obviously supplemented with much other real and imaginary information more or less surreptitiously obtained by the amateur revealer of mysteries.

*An evening at chess.* Chess is essentially a mathematical game, as is evidenced by the fact that the Royal Society Index lists no less than thirty mathematical papers on the "Knight's Move" alone. Mathematical students generally are fond of the game or enjoy learning it when not already players.

For an evening at chess the first requisite is a sufficient number of boards and sets of men so that every member can play. Before the play is begun a member of the club presents a brief sketch of the history of the game and the mathematical problems connected with it. The club is then divided into players and beginners. If convenient, the players may go into one room and the beginners into another. The players are seated at small tables and the play proceeds as in a progressive card game except that the time for play is limited (say to 10 or 15 minutes) and one of the best players, who has been chosen to act as judge and timekeeper, awards all unfinished games to the player who, in his judgment, holds the more advantageous position.

The beginners include all who have not yet learned the game. Two or three experienced players explain the game to them, illustrating by means of simple games based on easy checkmates such as the "fool's mate" and the "scholar's mate." After sufficient instruction has been given, the beginners divide into pairs and spend the evening playing, their instructors remaining in attendance to answer questions or give other assistance.

## PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL AND OTTO DUNKEL.

Send all communications about Problems and Solutions to **B. F. FINKEL**, Springfield, Mo.

### PROBLEMS FOR SOLUTION.

**2780. Proposed by ELMER LATSHAW, West Philadelphia, Pa.**

A polygon whose sides are  $a$ ,  $2a$ ,  $3a$ ,  $4a$  is inscribed in a circle. Find the radius of the circle.

**2781. Proposed by J. L. RILEY, Stephenville, Texas.**

Show that the asymptotic lines on a pseudospherical surface are curves of constant torsion.

**2782. Proposed by WARREN WEAVER, University of Wisconsin.**

A great number  $N$  of jackstraws are jumbled up in such a way that any one is as likely to have one direction as another. Show that the probable number that make an angle lying between  $\theta_1$  and  $\theta_2$  as measured from any given direction is equal to  $\frac{N(\cos \theta_1 - \cos \theta_2)}{2}$ .